



PHENIX MVD INSTALLATION PROCEDURE

procedure name

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Hand Processed Changes

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Approvals

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REVISION CONTROL SHEET

LETTER	DESCRIPTION	DATE	WRITTEN BY	APPROVED BY	CURRENT OVERSIGHT
A	First Issue	5/31/2000	n/a	P. Kroon, J. Sullivan, W. Lenz, C. Pearson	n/a
RETIRED	Installation Completed	3/20/2007	n/a	D. Lynch, P. Giannotti, R. Pisani for PHENIX	D. Lynch

MVD installation procedure

Overall summary:

We anticipate a two stage installation.

In stage 1 we move the detector, electronics, and cooling into the hall and connect it in the retracted position below the beam line. Several days of tests follow -- during which we have easy access to the detector. We then expect a period of data-taking during which further tests will take place. The total time for this stage 1 installation is estimated at 5 1/2 days. This includes 3 days of tasks which could be completed in advance with sufficient access to the IR. The major risk in this schedule is assuming only 2 days for electronics checkout.

The stage-2 installation is quicker (2 days) -- the detector is moved from the retracted position to the final position around the beam pipe. We would like to have the option of a third short period of access (1-2 days) between the stage-1 and stage-2 installation period to try to fix any problems observed following the stage-1 installation.

Stage 1

Most significant safety issue: Possible damage to Be beam pipe. **Solution:** During the stage 1 installation, the beam pipe will be protected by several inches of foam padding. Beam pipe vacuum should be isolated during the installation. In addition, this work will take place out of reach of the beam pipe (on a platform approximately 2.4 meters below the beam line). For details on the beam pipe protection, see the email message dated 7-June-2000 from Pete Kroon to phenix-dc-1 ([attached](#)).

Tasks which could be completed prior to stage 1 installation (if we had access):

Install MVD cooling systems and associated plumbing. Time estimate: 3 days. Install MVD rack electronics. Time estimate: 8 hours. The west access ladder, used to climb onto the top of the central magnet bottom yoke, must be in place. Time estimate: 1 hour. MVD north side cable bundles need to be installed in the cable trays and the MVD rack. The south side cables are not needed because only the north side of the MVD is instrumented in the year-1 configuration. Time estimate: 4 hours. Install MVD rack cables. Time estimate: 3 hours. MVD fiber optic, ethernet, and arcnet cables need to be installed. Time estimate: 3 hours. The MVD Installation Fixture and stand must be bolted to the MVD lift table. This item weighs approximately 20 pounds and does not need any special lifting equipment. Time estimate: 2 hours. Summary of time required for these steps which could be completed in advance: 3 days + 21 hours if done in series. This work could **probably** be completed in **3 days of uninterrupted access** with enough people working.

Lift fixtures:

No lift fixtures are required.

No rigging procedures are required.

No certification for special lifting is required.

Survey requirements:

The MVD is held by the MVD mount assemblies which are bolted to the central magnet nosecones. These items have been surveyed. No additional survey is required.

Delivery of MVD to Bldg 1008:

The MVD and most of the relevant equipment is currently in bldg 1008A. The remaining equipment should be in 1008A by June 13.

Installation procedure: Each MVD half is hand-carried into the interaction hall and handed to a person on top of the central magnet bottom yoke. Time estimate: 1 hour. The MVD halves are placed in the installation fixture and bolted together at the pivots. Time estimate: 1 hour. The installation fixture is arranged so that the MVD is clam-shelled together and fully supported. Time estimate: 1 hour. The cable bundles and the cooling lines are installed. Time estimate: 5 hours. Total time required for delivery and installation procedure: **1 shift**. In calculating the total time required (above), I called this "1/2 day".

Testing following installation:

All MVD components will be tested prior to installation. Still, something may need attention during the final turn-on process. General electronics test equipment (such as an oscilloscope) may be needed near the MVD rack. Time estimate: **2 days**. This is the real uncertainty in the schedule. It is almost impossible to predict the length of time required to debug a complex electronics readout system.

Stage 2:

Most significant safety issue: Possible damage to Be beam pipe. **Solution:** We will leave the foam padding around the beam pipe in place as long as possible. At the last possible moment, the foam padding will be removed and the MVD will be closed around the beam pipe. By working slowly and carefully, with the number of people on the platform limited to 2, the risk will be minimized. Beam pipe vacuum should be isolated during the installation. For details on the beam pipe protection, see the email message dated 7-June-2000 from Pete Kroon to phenix-dc-l (attached).

Installation procedure: Some cables and parts of the cooling system may have to be disconnected to lift the MVD close to its final position. Estimated time: 2 hours. Lift the MVD as high as possible with obstructing access to cooling and cable connections. Estimated time: 2 hours. reconnect all cables and cooling connections. Estimated time: 2 hours. Lift MVD to installed height. Estimated time: 2 hours. Close MVD around beam pipe. Estimated time: 1 hour. Recheck electronics readout. Estimated time: 1 day.

When will we be ready?

The following things need to be done before we can start the installation: A few days of work on cooling system components in Los Alamos, followed by shipment to BNL. Estimated arrival at

BNL: 9 June 2000. Delivery and testing of remaining DCIM boards. We will get 12 more DCIM boards by June 9. If at least 9 are good, we will have sufficient DCIM boards tested by June 21. If we need more, this will be delayed further. Testing of complete system (all DCIMs installed). Estimated completion date June 21. Complete checking of all channels (not all have been checked since shipment to BNL). Estimated completion date: 9 June 2000. Install inner enclosure on MVD. Estimated completion date Jun 19. Summary: We do not expect to start the last 2 1/2 days of the stage-1 installation prior to June 21.

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updated 20-Jun-2000

Subject: PHENIX Beam Pipe Protection

Date: Wed, 07 Jun 2000 13:25:57 -0400

From: Peter Kroon <kroon@bnl.gov>

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The PHENIX beam pipe in the interaction region consists of standard stainless steel vacuum tubing with a central section fabricated by brazing rolled beryllium sheet. The installation, support and adjustment of the beam pipe is the responsibility of CAD and their procedures cover all aspects of handling the beam pipe. The beryllium beam pipe is passivated with an epoxy coating and there are no direct hazards to personnel associated with contact with the beryllium section. Instead most of the procedures are directed toward minimizing the chances of mechanical failure.

There are several PHENIX operations that require work around the beryllium portion of the beam pipe. The MVD detector will be installed around the beam pipe inside the central magnet with a nominal radial clearance of 5 mm. The north BBC will be installed over the beryllium section and translated coaxially into its mount with a 1 cm radial clearance from the beam pipe.

In general PHENIX uses the following guidelines for work in the vicinity of the beryllium beam pipe:

- The beryllium beam pipe has a relatively low ductility and can be fractured by impact. Therefore any operation requiring work around or above the exposed beryllium section of the beam pipe should be planned to minimize the possibility of impact to the pipe. If it's practical there should be a barrier in place around it.

- The beryllium section of the beam pipe should not be handled in any way (even though it is passivated).

- NO force should be applied to any of the beam pipe or its supports in the entire IR - i.e. no laying cables on it etc.

In order to provide further protection during maintenance periods, the accessible portion of the beryllium section will be covered with foam pipe insulation (the same as used for the MVD cooling system pipes). This has an inside diameter of about 3.5 inches (larger than the 3 inch beam pipe diameter) and has a foam thickness of about 1 inch. The foam cover will be removed during data taking and as necessary for installation of the north BBC and the MVD. The installation procedures for these detectors will include steps dealing with this protection.

In the event of pipe breakage, an immediate Stop Work order is to be issued and the area vacated. The CAD Facility & Experimental Support Division is to be notified immediately to arrange for air sampling and proper cleanup.